I CLAIM:

1. A leadframe for use in the assembly of integrated circuit chips, comprising:

a base metal structure having an adherent layer comprising nickel covering said base metal;

an adherent layer of lead-free solder on said nickel layer, selectively covering areas of said leadframe suitable for parts attachment;

an adherent layer comprising palladium on said nickel layer, selectively covering areas of said leadframe suitable for bonding wire attachment; and

an adherent layer of silver on said solder and palladium layers, said silver being thin enough for complete dissolution into said solder upon heating.

2. The leadframe according to Claim 1 wherein said base metal is copper, copper alloy, brass, aluminum, iron-nickel alloy, or invar.

3. The leadframe according to Claim 2 wherein said base metal has a thickness between about 100 and 250 μm.

4. The leadframe according to Claim 1 wherein said nickel layer has a thickness in the range from about 0.5 to 3.0 μm.

5. The leadframe according to Claim 1 wherein said solder layer comprises alloys selected from a group consisting of tin, tin alloys including tin/copper, tin/indium, tin/silver, and tin/bismuth, and conductive adhesive compounds.

6. The leadframe according to Claim 5 wherein said solder

alloy has a reflow temperature compatible with wire bonding temperatures and molding temperatures.

7. The leadframe according to Claim 5 wherein said solder layer has a thickness in the range from about 0.7 to 9.0 μm.

8. The leadframe according to Claim 1 wherein said palladium layer has a thickness in the range from about 5 to 250 nm.

9. The leadframe according to Claim 8 wherein said palladium layer covers selective areas having boundaries of loose tolerance.

10. The leadframe according to Claim 1 wherein said silver layer has a thickness in the range from about 20 to 2500 nm.

11. The leadframe according to Claim 10 wherein said silver layer has a preferred thickness from about 1200 to 1500 nm.

12. The leadframe according to Claim 1 wherein said heating includes the temperatures and times employed for the processes of chip attaching, wire bonding, and device encapsulating.

13. A leadframe for use with integrated circuit chips comprising:

a base metal structure having a plated layer of nickel fully covering said base metal;

a plated layer of lead-free solder on said nickel layer, selectively covering areas of said leadframe suitable for parts attachment;

a plated layer of palladium on said nickel layer, selectively covering areas of said leadframe suitable for bonding wire attachment; and

a plated layer of silver on said solder and

palladium layers, said silver being thin enough for complete dissolution into said solder upon heating.

14. A leadframe for use with integrated circuit chips comprising:

a base metal structure having a plated layer of nickel fully covering said base metal;

a plated layer of tin/copper solder on said nickel layer, selectively covering areas of said leadframe suitable for parts attachment;

a plated layer of palladium on said nickel layer, selectively covering areas of said leadframe suitable for bonding wire attachment;

a plated layer of silver on said solder and said palladium layers; and

said solder having a reflow temperature above semiconductor assembly temperatures, whereby said solder and said silver covering said solder can be dissolved into soldering media without melting.

15. The leadframe according to Claim 14 wherein said tin/copper solder has between about 2 % and 15 % copper.

16. The leadframe according to Claim 14 wherein said soldering media include solder pastes and solder waves.

17. A semiconductor device comprising:

a leadframe comprising a chip mount pad for an integrated circuit chip and a plurality of lead segments, each having a first end near said mount pad and a second end remote from said mount pad;

said leadframe having a surface layer of nickel;

said leadframe further having a layer of palladium on said nickel layer, selectively covering said

first ends of said lead segments in a thickness suitable for bonding wire attachment;

said leadframe further having a layer of lead-free solder on said nickel layer, selectively covering said second ends of said lead segments in a thickness suitable for parts attachment;

said leadframe further having a layer of silver on said palladium and solder layers, the portion of said silver on said solder being dissolved into said solder;

an integrated circuit chip attached to said mount pad;

bonding wires interconnecting said chip and said first ends of said lead segments; and

encapsulation material surrounding said chip, bonding wires and said first ends of said lead segments, while leaving said second ends of said lead segments exposed.

18. The device according to Claim 17 wherein said bonding wires are selected from a group consisting of gold, copper, aluminum and alloys thereof.

19. The device according to Claim 17 wherein the bonding wire contacts to said first ends of said lead segments comprise welds made by ball bonds, stitch bonds or wedge bonds.

20. The device according to Claim 17 wherein said encapsulation material is selected from a group consisting of epoxy-based molding compounds suitable for adhesion to said leadframe.

21. The device according to Claim 17 further comprising lead segments having said second ends bent, whereby said segments obtain a form suitable for solder

attachment.

22. A method for fabricating a leadframe structure comprising a chip mount pad and a plurality of lead segments, each having a first end near said mount pad and a second end remote from said mount pad, comprising the steps of:

forming said structure from a sheet-like starting base metal;

plating a layer of nickel onto said leadframe;

selectively masking said chip pad and said first segment ends, thereby leaving said second segment ends exposed;

plating a layer of lead-free solder onto said nickel layer on said exposed segment ends in a thickness suitable for parts attachment;

selectively masking said second segment ends, thereby leaving said chip pad and said first segment ends exposed;

plating a layer of palladium onto said nickel layer on said exposed chip pad and segment ends in a thickness suitable for bonding wire attachment, and

plating a layer of silver onto said leadframe in a thickness suitable for complete dissolution into said solder upon heating.

23. The method according to Claim 22 wherein the process steps are executed in sequence without time delays, yet including intermediate rinsing steps.